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10/598,441	08/30/2006	Yasuaki Yuda	41035	5131
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PEARNE & GORDON LLP 1801 EAST 9TH STREET SUITE 1200 CLEVELAND, OH 44114-3108			SINGH, HIRDEPAL	
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

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### DETAILED ACTION

1. This action is in response to the preliminary amendment filed on August 30, 2006. Claims 1-9 are pending and have been considered below.

#### *Claim Objections*

2. Claims 1-9 are objected to because of the following informalities: Claim 1 recites "A wireless communication apparatus" in the preamble, and further in lines 19-20 recites "...a wireless communication apparatus with which the wireless communication apparatus conducts communication". It is unclear that the apparatus recited in line 19 is different than the one recited in preamble (as interpreted by the Examiner in the following action), if so it needs to be distinguished by saying e.g. "...a second wireless communication apparatus with which the [first] wireless communication apparatus conducts communication". Similarly claim 3 needs to be clarified that, the communication apparatus sending a known signal to a different communication apparatus (as interpret in this office action) or to itself.

3. Claim 3 recites the limitation "an already known signal transmission unit which transmits an already known signal..." in lines 4-5. Examiner interprets it as "an already known signal transmission unit which transmits the already known signal...", and suggests to make a change accordingly.

Appropriate correction is required.

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***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 3-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claim 3 recites the limitation "...an already known signal to the wireless communication apparatus communicating with the wireless communication apparatus ..." in lines 5-7. It is not clear whether the two wireless communication apparatus are different or the same wireless communication apparatus is communicating with itself. Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al. (US 2008/0037681) in view of Wallace et al. (US 2005/0185728).

**Regarding claim 1:**

Walton discloses a wireless communication apparatus for conducting wireless communications according to a time division duplex (TDD) system, comprising:

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a plurality of antennas (452 in figure 4);

a transmission circuit (454 TMTR in figure 4) for transferring a transmission signal to the plurality of antennas (paragraph 0116);

a reception circuit (454 RCVR in figure 4) for transferring a reception signal from the plurality of antennas;

a channel estimation unit (478 in figure 4) which detects channel information using the reception signal from the reception circuit (paragraph 0121); and

a correction value detection unit (480 in figure 4) which detects a correction value for correcting deviation (paragraphs 0122, controller controls the deviation calibration between transmission and receiver circuitry) occurring between the transmission circuit and the reception circuit using the channel information from the channel.

Walton discloses all of the subject matter as described above except for specifically teaching that the detected calibration or correction value is based on a correction signal transmitted from another (a second) wireless communication apparatus with which the wireless communication apparatus conducts communications.

However, Wallace in the same field of endeavor discloses a system and method for calibrating uplink and downlink channel responses where the detected calibration or correction value (322 and 342 in figure 3, as shown in present invention figure 4) is based on a correction signal transmitted from another (a second) wireless communication apparatus (i.e. access point or base station, see figure 1) with which the wireless communication apparatus conducts communications (downlink steered or probe signal sent by access point, see paragraph 0011; is sent after the channel

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response is calculated and use for calibration at both user terminal and base station paragraph 0010 and 0021, table 1).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to use teachings of Wallace in Walton to calibrate the differences in transmission and reception circuits based on a correction value that is sent by the access point or base station to the user terminal in a follow up of the calibration process to account for the errors in the correction matrices of Wallace to correct the deviation or difference in the actual uplink and downlink channel responses to keep the system performance at optimum level by updating the calibration errors that occur due to changing condition in the channel and other factors in the communication system by keeping higher throughput and greater reliability.

9. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al. (US 2008/0037681) in view of Wallace et al. (US 2005/0185728) as applied to claim 1 above, and further in view of Chien (US 2007/0275674).

**Regarding claim 2:**

Walton discloses all of the subject matter as described above except for specifically teaching a reception weight generation unit which generates reception weight using the channel information from the channel unit; a reception signal weighting and unit which weights a plurality of reception signals from the reception circuit using the reception weight combines the signals; a transmission weight generation unit which generates transmission weight using the reception weight and the correction value from

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the correction value unit; and a transmission signal weighting unit which weights transmission data using the transmission weight.

However, Chien in the same field of endeavor discloses a system and method for compensating IQ imbalance in digital transceivers where a reception weight generation and weighting unit (receiver compensation factor estimator 726 in figure 7) which generates reception weight using the channel information from the channel unit; a transmission weight generation and weighting unit (776 in figure 7) which generates transmission weight using the reception weight and the correction value from the correction value unit.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to use teachings of Chein in Walton to calibrate the differences in transmission and reception circuits in the multi antenna system based on weighting factor that corresponds to channel conditions to generate a correction value for correcting the deviation or difference in the actual uplink and downlink channel responses to keep the system performance at optimum level by updating the calibration errors that occur due to changing condition in the channel and other factors i

### ***Allowable Subject Matter***

10. Claims 3-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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11. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record discloses a system for time division duplex communication with multiple antennas, where the wireless communication apparatus and the base station or access point estimates the channel and based on the channel condition corrected or calibrate the deviation or imbalance in the transmission and reception circuits and further the base station sends a correction value in the transmitted signal to the user terminal for further correction, but prior art fails to teach or disclose that the correction value detection unit detects the correction value for correcting deviation occurring between the transmission and reception circuits connected to each antenna from the correction signal transmitted from the different wireless communication apparatus i.e. base station with which the wireless communication apparatus conducts communications and the different/second communication apparatus transmits a known signal to first wireless communication apparatus. these limitations are part of the dependent claims, but the claim(s) would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and overcome the objections and rejections set forth in this office action.

### ***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.



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- a. Moon et al. (US 2003/0211851) discloses a radio communication system with channel estimation is used in mobile station and base station to adjust the pilot symbol insertion based on channel estimation.
- b. Jalali et al. (US 2008/0107048) discloses a TDD communication system and method for forward and reverse link channel estimation.
- c. Walton et al. (US 2008/0069015) discloses a MIMO system with uplink and downlink calibration using channel estimation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HIRDEPAL SINGH whose telephone number is (571) 270-1688. The examiner can normally be reached on Mon-Fri (Alternate Friday Off) 8:30AM-6:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/H. S./

Examiner, Art Unit 2611

/Shuwang Liu/

Supervisory Patent Examiner, Art Unit 2611